New Break seal method for high precision clumped isotope analysis of carbonate reference material

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Recent investigations on clumped isotope analysis on carbonate cast doubt on various factors. The two popular methods in practise suffer from the effect of leak through joints and connections. In order to circumvent this we showed here a new break seal method where we can confine the carbonate powder in an isolated tube and surrounded by 3ml of H_3PO_4 (100%) acid. The entire setup made with pyrex glass is sealed after high vacuum evacuation (10^{-3} mbar). The reaction can be initiated by gentle shaking of entire assembly. Several such break seal with Cararra carbonate powder (used as internal standards MARJ1) were reacted at 25°C for 12 hours in a batch comprising of 4 replicates. NBS-19 standard was also analysed using the same protocol. The result was obtained based on repeated analysis of MARJ1 and NBS-19 standards suggest a reproducible (1σ) $\delta^{18}O$ and $\delta^{13}C$ values of 0.09‰ and 0.04‰ respectively, whereas the Δ_{47} value for carbonate was reproducible at a level of 0.02‰. The new method is now been experimented to revisit the calibration of carbonates at a temperature range of 10-70°C and to understand the effect of reaction temperature on Δ_{47}.